

## Cryogenic and Vacuum Compatible Metrology Systems, Phase I

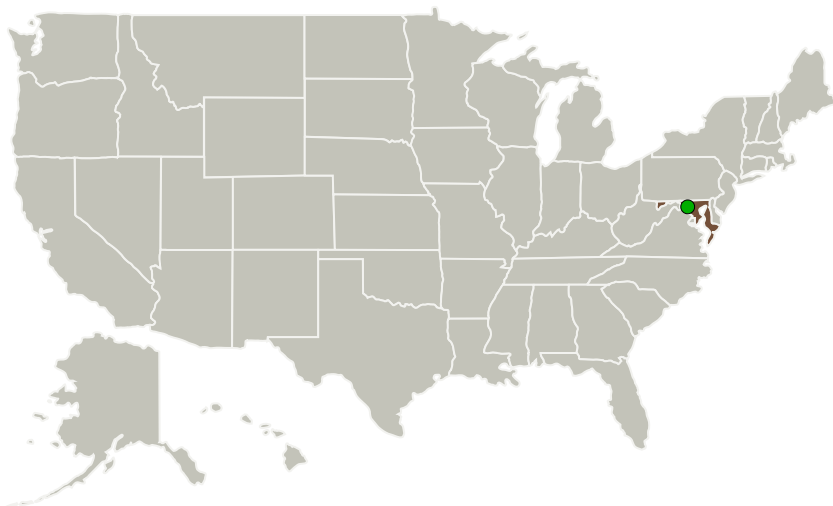
Completed Technology Project (2012 - 2012)



## Project Introduction

In this Phase I SBIR project for NASA, Flexure Engineering of Greenbelt, MD will leverage the work we did in our current SBIR project entitled: Cryogenic Optical Metrology Through A Chamber Window by producing an orthogonal development path that will push the envelope of integrating optical metrology instrumentation to a space environment simulation facility. We plan to fully integrate a Laser Radar scanning head inside a thermal-vacuum chamber for operation in cryogenic and high vacuum conditions. Once a scanning head can function in this environment, the next development is a multi-headed scanning system inside a chamber controlled by one Laser Radar body outside the chamber. This system can potentially obtain better than five micron uncertainties with these innovations. Other instruments will also be targeted for facility integration; thermal imaging instruments, optical performance instrumentation and other alignment/metrology instruments that complement the Laser Radar. This innovation provides NASA and the Aerospace Community increased capabilities for the alignment and performance verification of telescope optical surfaces and telescope optical assemblies. A key feature is that the metrology system is integrated inside the chamber providing micron-level uncertainties across large distances and of complex shapes. With the metrology system inside the chamber, the environment will be considerably easier to control and Flight Hardware can be verified in a more accurate setting (cold, vacuum, dark) than a chamber with windows and other environment-compromising heat and light leaks.

## Primary U.S. Work Locations and Key Partners

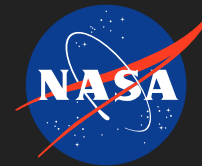


Cryogenic and Vacuum  
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Organizations Performing Work	Role	Type	Location
Flexure Engineering	Lead Organization	Industry	College Park, Maryland
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

## Primary U.S. Work Locations

Maryland

## Project Transitions

**February 2012:** Project Start**August 2012:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138066>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Flexure Engineering

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

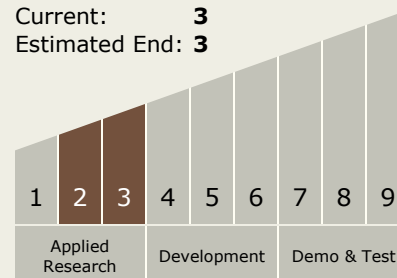
Carlos Torrez

**Principal Investigator:**

Gregory A Scharfstein

## Technology Maturity (TRL)

Start: 2  
 Current: 3  
 Estimated End: 3



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## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.1 Chemical Space Propulsion
    - └ TX01.1.3 Cryogenic

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System